EROSION CONTROL PLAN

Applicant (Owner):_____ Date:_____
Business Address:_____
Business Phone:_____
Home Address:_____
Home Phone:_____
Subdivision/Legal Description: _____
_____

A. I, _____, hereby submit to the Natrona County Development Department, Natrona County, Wyoming, a plan to remove the natural top soil, trees, and other vegetation and alter the existing contours through grading for the construction of roadways, utility installations, building sites or development in the above-described location, which is located _____ miles from the City of Casper and is more specifically identified on the attached plat or drawing.

B. This Erosion Control Plan shall:
   1. Be completed prior to any future development on the subject property; and
   2. Become a part of any future covenants established by the owner for the subject property.

C. The Erosion Control Conservation Plan shall consist of the following information:
   1. Total acreage:_____
   2. Total acreage to be exposed through grading for construction purposes:_____
   3. Soil classifications, in accordance with the Unified Soils Classification System. If more than one soil classification is involved, a map showing the soil classifications shall be attached:_____
      _____
   4. Map showing existing and proposed contours._____
   5. Vegetation type to be removed from the exposed area (Major types and common names only)._____
      _____
   6. Maximum slopes of the exposed areas:_____
      _____
   7. Proposed method of stripping, storing, and replacing of topsoil._____
      _____
      _____
      _____
      _____
      _____
      If special erosion problems exist, check the appropriate:
      ___Active Sand Dunes __Alkali areas ___Bentonite areas ___Other
   8. Proposed method of reseeding of vegetation of the exposed areas._____
      _____
      _____
      _____
      _____
      _____

9. Proposed method of maintaining slopes of exposed areas after seeding and mulching. _____

_____

_____

_____

_____

10. Proposed method of controlling wind erosion on areas developed when grass seeding is not practical or the exposed areas will lie fallow for a period of less than six months.

_____

_____

_____

_____

11. Proposed method of controlling water erosion on steep slopes or other applicable areas:_____

_____

_____

_____

_____

12. Owner may submit to the County Development Department for their review and approval, an alternate method of erosion control other than that required in the attached erosion control methods. The alternate method shall be denied within 45 days after officially being submitted to the Department, or the owner may assume that the Department has approved the alternate method.
13. If the owner fails to initiate or complete the above Erosions Control Conservation Plan, and if the County, at its sole discretion, completes any erosion control conservation program that is acceptable and approved by the Department, the owner agrees to pay to the County all costs incurred in initiating and completing the erosion control plan that is acceptable and approved by the Department.
14. This Erosion Control Conservation Plan shall be binding and shall inure to the benefit of all parties hereto, their successors and assigns.
15. The Conservation District is available for consultation on erosion control projects on a voluntary basis.
16. Review and recommendations by the Board or Authorized Designee:

OWNER OR AGENT

_____

_____

Date

NATRONA COUNTY DEVELOPMENT DEPT.
NATRONA COUNTY, WYOMING

_____

Director or Authorized Designee
Approved this ___ day of _____, 20___.

EROSION CONTROL METHODS

Stage construction and schedule projects so clearing and grading are done during the time of minimum erosion potential.

Avoid area wide clearance of construction sites. Plan and stage land disturbance activities so that only the area currently under construction is exposed. As soon as the grading and construction in an area are complete, that area should be stabilized.

Clear only areas essential for construction.

Often areas of a construction site are unnecessarily cleared. Only those areas essential for completing construction activities should be cleared, and other areas should remain undisturbed. Additionally, the proposed limits of land disturbance should be physically marked off to ensure that only the required land is cleared. Avoid disturbing steep slopes or other critical areas.

Locate potential nonpoint pollutant sources away from steep slopes, waterbodies, and critical areas.

Material stockpiles, borrow areas, access roads, and other land-disturbing activities can often be located away from critical areas such as steep slopes, highly erodible soils, and areas that drain directly into sensitive waterbodies.

Route construction traffic to avoid existing or newly planted vegetation.

Where possible, construction traffic should travel over the areas that must be distributed for other construction activity. This practice will reduce the area that is cleared and susceptible to erosion.

Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.

Tree armoring protects tree trunks from being damaged by construction equipment. Fencing can also protect tree trunks, but should be placed at the tree's drip line so that construction equipment is kept away from the tree. The tree drip line is the minimum area around a tree in which the tree's root system should not be disturbed by cut, fill or soil compaction caused by heavy equipment. When cutting or filling must be done near a tree, a retaining wall or tree well should be used to minimize the cutting of the tree's roots or the quantity of fill placed over the tree's roots.

Stripping, storing and replacing topsoil.

Because of the high organic content of topsoil, it cannot be used as fill material or under pavement. Since topsoil is essential to establish new vegetation, it shall be stockpiled and then reapplied to the site for revegetation, if appropriate. Although topsoil salvaged from the existing site can often be used, topsoil may need to be imported onto the site if the existing topsoil is not adequate for establishing new vegetation.

When stripping top soil from the designated area, brush, grass agricultural crops or other suitable materials shall be retained as mulch and incorporated into the topsoil. Unless the topsoil can be placed directly on the prepared slopes or exposed areas, the topsoil shall be stockpiled for future

use to cover embankments, cut slopes or exposed areas. Unprotected stockpiles are very prone to erosion and therefore stockpiles must be protected. The topsoil shall be reapplied to the site in a uniform manner to a depth commensurate with the quantity of topsoil available and the area to be covered. Topsoil shall be keyed to the underlying material by scarifying along contours to a depth of approximately six inches. In urban type developments, which have a density of three units per acre or more, the owner, during the time the exposed area is being revegetated or built upon, shall control blowing dust by either watering or installing wind fences.

Reseeding/revegetation.

Prior to seeding the slopes, the slopes shall be graded along contours to the designated grade and, where necessary, topsoil shall be uniformly spread along contours in accordance with acceptable conservation practices. After the topsoil has been uniformly spread, the area shall be scarified along the contours to a depth of approximately six inches leaving furrows. The surface shall be left in an uncompacted, workable condition ready for mulching and revegetation. Areas not suitable for scarifying shall be left in a condition satisfactory to the Board or the Board's Designee. After the slope or exposed areas have been prepared, the owner shall broadcast commercial fertilizer at a recommended rate based upon a soils analysis, or 40 pounds of available nitrogen and 20 pounds of available phosphorus per acre. The area shall then be seeded using a grain drill with a grass seed attachment or special grass drill. Planting depth shall be one half inch to one and one quarter inches. Seeding shall be applied between the time the frost leaves the ground in the spring and before the frost enters the ground in the fall. The preferable period of seeding is early spring or late fall. Should the owner seed the area through the hot months, he would be required to water. Seeded areas must be protected until the new grass seedlings are thoroughly established. Hydraulic mulching will be acceptable after the grass seed has been drilled. Grain straw or grass hay shall then be used at a minimum rate of two tons per acre and anchored to the surface with a disc or coulter mulching machine. Erosion control blankets will be acceptable in lieu of mulching.

Maintaining slopes of exposed areas after mulching and seeding.

Once an area is seeded and mulched, all surface exposure (grazing and vehicular traffic) shall be prohibited. Reseeding, if necessary, shall follow the procedures described above.

Prevention of Wind Erosion

Wind erosion control measures should be placed perpendicular to the wind direction. Types of wind erosion control follow.

- Apply and anchor straw. Apply approximately 1 to 2 tons per acres.
- Apply manure. Apply approximately 6 to 8 tons per acre. Manure should contain sufficient moisture and be of ample size so it will not easily dislodge or break up.
- Set up rows of temporary artificial barriers such as straw bales, snow fences, or board fences. Spacing of rows should be approximately 10 to 15 times the barrier height.
- Create soil ridges by listing, chisel points, ripping, grader, etc. Height and spacing varies depending on conditions. Cloddy ridges are preferred.
- Hydromulch
- Moisten soil surfaces with water. Applications of water are repeated as necessary to be effective and must be monitored to prevent water erosion.

- Apply liquid magnesium chloride, liquid latex polymer, emulsified petroleum resin, or other appropriate soil stabilization chemicals.

Prevention of Water Erosion

- **Intercept runoff above disturbed slopes and convey it to a permanent channel or storm drain.**

Earth dikes, perimeter dikes or swales, or diversions can be used to intercept and convey runoff above distributed areas. An earth dike is a temporary berm or ridge of compacted soil that channels water to a desired location. A perimeter dike/swale or diversion is a swale with a supporting ridge on the lower side that is constructed from the soil excavated from the adjoining swale. These practices should be used to intercept flow from denuded areas or newly seeded areas to keep the disturbed areas from being eroded from the uphill runoff. The structures should be stabilized within 14 days of installation. A pipe slope drain, also known are a pipe drop structure, is a temporary pipe placed from the top of a slope to the bottom of the slope to convey concentrated runoff down the slope without causing erosion.

- **On long or steep, disturbed, or man-made slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.**

Benches, terraces, or ditches break up a slope by providing areas of low slopes in the reverse direction. This keeps water from proceeding down the slope at increasing volume and velocity. Instead, the flow is directed to a suitable outlet, such as a sediment basin or trap. The frequency of benches, terraces, or ditches will depend on the erodibility of the soils, steepness and length of the slope, and rock outcrops. This practice should be used if there is a potential for erosion along the slope.

- **Use retaining walls.**

Often retaining walls can be used to decrease the steepness of a slope. If the steepness of a slope is reduced, the runoff velocity is decreased and, therefore, the erosion potential is decreased.

- **Provide linings for urban runoff conveyance channels.**

Often construction increases the velocity and volume of runoff, which causes erosion in newly constructed or existing urban runoff conveyance channels. If the runoff during or after construction will cause erosion in a channel, the channel should be lined or flow control BMP's installed. The first choice of lining should be grass or sod since this reduces runoff velocities and provides water quality benefits through filtration and infiltration. If the velocity in the channel would erode the grass or sod, then riprap, concrete, or gabions can be used.

- **Use check dams.**

Check dams are small, temporary dams constructed across a swale or channel. They can be constructed using gravel or straw bales. They are used to reduce the velocity of concentrated flow and, therefore, to reduce the erosion in a swale or channel. Check dams should be used when a swale or channel will be used for a short time and therefore it is not feasible or practical to line the channel or implement flow control BMPs.

- **Seed and fertilize.**

Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once a dense vegetative cover has been established. However, often seeding and fertilizing do not produce a thick vegetative cover as do seeding and mulch or netting. Newly established vegetation does not have as extensive a root system as existing vegetation and therefore is more prone to erosion, especially on steep slopes. Care should be taken when fertilizing to avoid untimely or excessive application. Since the practice of seeding and fertilizing does not provide any protection during the time of vegetative establishment, it should be used only on favorable soils in very flat areas and not in sensitive areas.

- **Use seeding and mulch/mats.**

Seeding establishes a vegetative cover on disturbed areas. Seeding is very effective in controlling soil erosion once the vegetative cover has been established. The mulching/mats protect the disturbed area while the vegetation becomes established.

The management of land by using ground cover reduces erosion by reducing the flow rate of runoff and the raindrop impact. Bare soils should be seeded or otherwise stabilized within 15 calendar days after final grading. Denuded areas that are inactive and will be exposed to rain for 30 days or more should also be temporarily stabilized, usually by planting seeds and establishing vegetation during favorable seasons in areas where vegetation can be established. In very flat, non-sensitive areas with favorable soils, stabilization may involve simply seeding and fertilizing. Mulching and/or sodding may be necessary as slopes become moderate to steep, as soils become more erosive, and as areas become more sensitive.

- **Use mulch/mats.**

Mulching involves applying plant residues or other suitable materials on disturbed soil surfaces. Mulch/mats used included tacked straw, wood chips, and jute netting and are often covered by blankets or netting. Mulching alone should be used only for temporary protection of the soil surface or when permanent seeding is not feasible. The useful life of mulch varies with the material used and the amount of precipitation, but is approximately 2 to 6 months. During times of the year when vegetation cannot be established, soil mulching should be applied to moderate slopes and soils that are not highly erodible. On steep slopes or highly erodible soils, multiple mulching treatments should be used. On a high-elevation or desert site where grasses cannot survive the harsh environment, native shrubs may be planted. Interlocking ceramic materials, filter fabric, and netting are available for this purpose. Before stabilizing an area, it is important to have installed all sediment controls and diverted runoff away from the area to be planted. Runoff may be diverted away from denuded areas or newly planted areas using dikes, swales, or pipe slope drains to intercept runoff and convey it to a permanent channel or storm drain. Reserved topsoil may be used to revegetate a site if the stockpile has been covered and stabilized.

Consideration should be given to maintenance when designing mulching and matting schemes. Plastic nets are often used to cover the mulch or mats; however, they can foul lawn mower blades if the area requires mowing.

- **Use sodding.**

Sodding permanently stabilizes an area. Sodding provides immediate stabilization of an area and should be used in critical areas or where establishments of permanent vegetation by seeding and mulching would be difficult. Sodding is also a preferred option when there is a high erosion potential during the period of the vegetative establishment from seeding.

- **Use wildflower cover.**

Because of the hardy drought-resistant nature of wildflowers, they may be more beneficial as an erosion control practice than turf grass. While not as dense as turf grass, wildflower thatches and associated grasses are expected to be as effective in erosion control and containment absorption. Because thatches of wildflowers do not need fertilizers, pesticides, or herbicides, and watering is minimal, implementation of this practice may result in a cost savings.

A wildflower stand requires several years to become established; maintenance requirements are minimal once the area is established.

Sediment Control

Sediment controls capture sediment that is transported by runoff. Filtration and detention (gravitational settling) are the main processes used to remove sediment from runoff.

- **Sediment Basins.**

Sediment basins, also known as silt basins, are engineered impoundment structures that allow sediment to settle out of runoff. They are installed prior to full-scale grading and remain in place until the disturbed portions of the drainage area are fully stabilized. They are generally located at the low point of sites, away from construction traffic, where they will be able to trap sediment-laden runoff. Sediment basins are typically used for drainage areas between 5 and 100 acres.

- **Sediment Trap.**

Sediment traps are small impoundments that allow sediment to settle out of runoff water. Sediment traps are typically installed in a drainage way or other point of discharge from a disturbed area.

- **Filter Fabric Fence.**

Filter fabric fence is available from many manufacturers and in several mesh sizes. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet flow (i.e., no concentrated flow), and the maximum drainage area to the fence should be 0.5 acre or less per 100 feet of fence. Filter fabric fences have a useful life of approximately 6 to 12 months.

- **Straw Bale Barrier.**

A straw bale barrier is a row of anchored straw bales that detain and filter runoff. Straw bales are less effective than filter fabric, which can usually be used in place of straw bales. However, straw bales have been effectively used as temporary check dams in channels. As with filter fabric fences, straw bale barriers should be used only where there is sheet flow. The maximum drainage area to the barrier should be 0.25 acre or less per 100 feet of barrier. The useful life of straw bales is approximately 3 months.

- **Inlet Protection.**

Inlet protection consists of a barrier placed around a storm drain drop inlet, which traps sediment before it enters the storm sewer system. Filter fabric, straw bales, gravel, or sand bags are often used for inlet protection.

- **Vegetated Filter Strips.**

Vegetated filter strips are low-gradient vegetated areas that filter overland sheet flow. Runoff must be evenly distributed across the filter strip. Channelized flows decrease the effectiveness of filter strips. Level spreading devices are often used to distribute the runoff evenly across the strip.

Vegetated filter strips should have relatively low slopes and adequate length and should be planted with erosion-resistant plant species. The main factors that influence the removal efficiency are the vegetation type, soil infiltration rate, and flow depth and travel time. These factors are dependent on the contributing drainage area, slope of strip, degree and type of vegetative cover, and strip length. Maintenance requirements for vegetated filter strips include sediment removal and inspection to ensure that dense, vigorous vegetation is established and concentrated flows do not occur.